

## นิพนธ์ต้นฉบับ

## Original Article

# A Causal Relationship Model of COVID-19 Prevention Behavior of the Older Adults: Upper Central Region, Thailand

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## Abstract

The elderly population is particularly vulnerable to the severe illnesses and deaths caused by COVID-19. This cross-sectional analytical study aimed to investigate a causal relationship model of COVID-19 preventative behavior among elderly people. The sample size was 400 elderly people aged 60 to 79 who were selected via a multi-stage randomization process from three provinces in the upper central region: Nakhon Sawan, Kamphaeng Phet, and Uthai Thani. Between June 1 and September 12, 2022, data was collected using interview forms. The study's dependent variable was COVID-19 preventive behaviors, with personal data, healthy habits, and health communication serving as latent variables. Data was examined using descriptive statistics including percentages, means, and standard deviations, as well as confirmatory factor analysis utilizing packaged statistical software. The findings revealed that the causal relationship model of older people's COVID-19 preventative behavior, based on hypotheses, had a good level of consistency compatible with the empirical data, as indicated by a chi-square value of 8.249, a degree of freedom of 15, a  $\chi^2/df$  ratio of 0.550, and a p-value of 0.913. The fit indices were robust (GFI = 0.941, AGFI = 0.986, with SRMR and RMSEA values of 0.00). Personal healthy habit factors (0.34), and health communication factors (0.32) had direct effects on the model, while healthy habit factors (0.12) and personal factors (0.05) had an indirect impact. Together, these variables explained 34.0% of the variance in preventative behavior. Personal healthy habits factors, health communication factors, and personal factors were revealed to be the most significant predictors of COVID-19 prevention behaviors. As a result, improving COVID-19 prevention among the elderly is crucial, highlighting the importance of promoting and strengthening daily healthy practices and knowledge distribution among families and communities.

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## รูปแบบความสัมพันธ์เชิงสาเหตุพฤติกรรมกรรมการป้องกันโรคโควิด-19

### ของผู้สูงอายุ: เขตภาคกลางตอนบนประเทศไทย

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### บทคัดย่อ

ประชากรสูงอายุเป็นกลุ่มเฉพาะที่มีความเสี่ยงต่อการเกิดอาการป่วยรุนแรงและเสียชีวิตจากโรคโควิด-19 การศึกษาภาคตัดขวางเชิงวิเคราะห์ที่มีวัตถุประสงค์เพื่อวิเคราะห์รูปแบบความสัมพันธ์เชิงสาเหตุพฤติกรรมกรรมการป้องกันโรคของผู้สูงอายุ กลุ่มตัวอย่างคือผู้สูงอายุ 60 ถึง 79 ปี จำนวน 400 คน คัดเลือกโดยวิธีการสุ่มแบบหลายขั้นตอนจากสามจังหวัดเขตภาคกลางตอนบนได้แก่ นครสวรรค์ กำแพงเพชร และอุทัยธานี เก็บรวบรวมข้อมูลด้วยแบบสัมภาษณ์ระหว่างวันที่ 1 มิถุนายน ถึง 12 กันยายน 2022 ตัวแปรที่การศึกษาประกอบด้วยตัวแปรตามคือพฤติกรรมกรรมการป้องกันโรค COVID-19 และตัวแปรแฝง ได้แก่ ปัจจัยส่วนบุคคล สุขนิสัยส่วนบุคคล และสื่อสารด้านสุขภาพ สถิติที่ใช้ในการวิเคราะห์ สถิติเชิงพรรณนา ประกอบด้วย ร้อยละ ค่าเฉลี่ย และ ส่วนเบี่ยงเบนมาตรฐาน และสถิติเชิงวิเคราะห์การ สร้างแบบจำลองสมการโครงสร้างโดยใช้โปรแกรมสำเร็จรูป ผลการศึกษารูปแบบความสัมพันธ์เชิงสาเหตุ พฤติกรรมการป้องกันโรคโควิด-19 ของผู้สูงอายุที่พัฒนาขึ้นตามสมมติฐาน สอดคล้องกับข้อมูลเชิงประจักษ์ ตามเกณฑ์ในระดับดี พิจารณาจากค่าไคสแควร์ ( $\chi^2 = 8.249$ ) ค่าองศาอิสระ ( $df=15$ ) ค่าดัชนี อัตราส่วนไคสแควร์สัมพันธ์ ( $\chi^2/df = 0.550$ ) และค่านัยสำคัญทางสถิติ ( $p\text{-value} = 0.913$ ) ดัชนีวัดระดับความกลมกลืน ( $GFI = 0.941$ ) ค่าดัชนีวัดระดับความกลมกลืนปรับแก้ ( $AGFI = 0.986$ ), ค่าดัชนี ความคาดเคลื่อนในการประมาณค่าพารามิเตอร์ และ ดัชนีรากมาตรฐานของค่าเฉลี่ยกำลังสองของส่วนที่เหลือ ( $RMSEA \& SRMR = 0.00$ ) ปัจจัยสุขนิสัยส่วนบุคคล (0.34) และปัจจัยสื่อสารด้านสุขภาพ (0.32) มีผลโดยตรง ขณะที่ปัจจัยสุขนิสัยส่วนบุคคล (0.12) และปัจจัยส่วนบุคคล (0.05) มีผลทางอ้อม ต่อแบบจำลอง โดยทั้งสามองค์ประกอบสามารถร่วมกันอธิบายความแปรปรวนในพฤติกรรมกรรมการป้องกันโรคของผู้สูงอายุได้ร้อยละ 34.0 ปัจจัยสุขนิสัยส่วนบุคคล ปัจจัยสื่อสารด้านสุขภาพ และปัจจัยส่วนบุคคล เป็นตัวพยากรณ์พฤติกรรมกรรมการป้องกันโควิด-19 ที่สำคัญที่สุด ดังนั้น การปรับเปลี่ยนพฤติกรรมกรรมการป้องกันโควิด-19 ของผู้สูงอายุ สิ่งสำคัญควรเน้นถึงความสำคัญของการส่งเสริมและเสริมสร้างแนวทางปฏิบัติด้านสุขภาพประจำวัน ร่วมกับการสื่อสารความรู้ครอบครัวและชุมชน

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Keywords	คำสำคัญ
COVID-19	โควิด-19
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Upper Central Region of Thailand	เขตภาคกลางตอนบนของประเทศไทย

## Background

The coronavirus disease 2019 (COVID-19) was identified as the source of an outbreak in Hubei, China, in January 2020. COVID-19 quickly spread worldwide, prompting the World Health Organization to declare a pandemic on March 11, 2020. <sup>(1-2)</sup> The number of new cases and deaths grew to 3,000-4,000 and 200-300 cases daily, respectively. <sup>(3)</sup> By the end of 2022, COVID-19 had infected 4.77 million individuals and killed 34,614 in Thailand. <sup>(4)</sup> The COVID-19 pandemic is a global public health concern that has caused illness and death in all age groups in the majority of countries, affecting individual lives while protecting and limiting the outbreak. <sup>(5-6)</sup> Previous research has shown that older people are more likely to develop major diseases and die as a result of COVID-19. <sup>(7-8)</sup>

Most elderly people get chronic diseases such as heart disease, lung disease, diabetes, cancer, and high blood pressure as their immune systems deteriorate. <sup>(9)</sup> As older people's immune systems deteriorate, they are more likely to contract severe COVID-19 and require critical care and a ventilator to breathe when admitted to the hospital. <sup>(10)</sup> Thailand has one of the highest aging rates in Southeast Asia, with an aging population of 18.1% and a super-aged population of 31.4% by 2020 and 2040. In the upper central region of Thailand (Health Region 3), which includes the provinces of Nakhon Sawan (20.9%), Kamphaeng Phet (18.4%), and Uthai Thani (20.6%), the proportion of older people is increasing, and older people are more likely to suffer from chronic conditions like diabetes and hypertension. <sup>(11-12)</sup>

According to data from the Ministry of Public Health's Department of Disease Control (DDC) collected from thirteen health region offices, including Health Region 3, between January 1 and December 31, 2021, there were 1,667,792 cases of COVID-19, with 182,950 older people aged 60 and up infected, accounting for 11.0% of the total population. In 2021, 78,278 older adults infected with COVID-19 were men (42.8%), with 104,672 being women (57.2%). There were 110,991 COVID-19 cases among those aged 60-69 years (6.7% of the total), 48,577 between the ages of 70 and 79 (2.9%), and 23,382 over the age of 80 (1.4%). The elderly (80 years and older) had the highest (21.6%) risk of dying from COVID-19. <sup>(13)</sup> This is a vital issue to address.

Both direct and indirect infection are the most important ways to prevent the transition to COVID-19; thus, COVID-19 preventive behaviors include wearing masks correctly to prevent

respiratory tract infection, washing hands frequently to avoid contact infection, including social distancing, and staying at home.<sup>(11,14-15)</sup> The two most essential aspects are that due to the increased risk of COVID-19 infection and serious complications in this area, preventive methods for the elderly should be examined. There has been no previous research on a causal relationship model for preventative measures in older adults. This study aimed to investigate a causal relationship model for COVID-19 prevention interventions in the elderly. As a result, the findings of this study will be useful in guiding further research for the promotion and prevention of COVID-19 or other respiratory tract infections, particularly in the elderly.

## Material and Method

### *Design and Sample*

The cross-sectional analytic study focused on elderly persons aged 60 to 79 from Thailand's Upper Central Region, namely the provinces of Nakhon Sawan, Kamphaeng Phet, Phichit, Chai Nat, and Uthai Thani, between June 1st and September 12th, 2022. The data, received in 2020 from the Department of Local Administration, Ministry of Interior, includes five provinces: Chai Nat, Kamphaeng Phet, Phichit, Uthai Thani, and Nakhon Sawan. The combined population of these provinces was 605,038 people. A sample size of 384 participants was estimated using a margin of error of  $\pm 5\%$ , a confidence interval of 95%, and a 50% response distribution. Additionally, a multistage cluster random sampling method was used. A sample size modification was made to account for a collection error of 4%. This yielded a total sample size of 400 people.<sup>(16)</sup> The following inclusion and exclusion criteria were used to choose volunteers for the project: Thai seniors aged 60 to 79 who had lived in the targeted area for at least a year and had received two doses of the COVID-19 vaccination, as well as volunteers with mental health issues, intellectual disabilities, or significant diseases who were unable to provide feedback, were excluded from participation.

The five steps of multi-stage sampling for sample selection included sampling three of the five provinces (Kamphaeng Phet, Nakhon Sawan, and Uthai Thani), followed by sampling two districts from each province (6 districts). The third phase entails sampling two subdistricts in each district (12 subdistricts), followed by the fourth and fifth steps, which comprise sampling four villages in each subdistrict (48 villages) and 400 older people based on the proportion of the population identified through name lists. Five of the sample phases were completed using a basic random sampling method. In the fifth step, samples were chosen based on three criteria: first, they were older persons aged 60 to 79 years; second, they were Thai nationals; and third, they had lived in the target area for more than a year. The four hundred samples were chosen at random based on the population of each province, revealing that Kamphaeng Phet had 7-8 people per village totaling 126 people, Nakhon Sawan had 12-13 people per village totaling 209 people, and Uthai Thani provinces had 4-5 people per village totaling 65 people.

### ***Measurement Tool and Variables***

The results were acquired by questioning 400 samples with a questionnaire created expressly by reviewing literature for this objective. The interview form was divided into 17 items from four sections. First, personal data was divided into personal data, two items (such as gender and chronic conditions), and health communication data. The two components were: 1) informing your family and neighbors about COVID-19; and 2) inquiring about and monitoring any odd indications or symptoms in your family and friends. The third component provided information on personal healthy practices, which contained three items: 1) consuming nutrient-dense foods; 2) getting at least 8 hours of sleep per day; and 3) exercising for 30 minutes per day. The final section contained COVID-19 preventive behavior data, which included ten items such as 1) taking an injection of a COVID-19 vaccine; 2) avoiding going to a crowded place if I felt I had an illness; 3) avoiding going to a crowded place if I had close contact with a patient; 4) wearing a mask when going out of the house; 5) wearing a mask while cutting hair; 6) testing the Antigen Test Kit (ATK) if I had close contact with a patient; 7) keeping a distance of at least 1-2 meters from others; 8) observing abnormal symptoms in myself during the COVID-19 pandemic; 9) maintaining a distance when eating with another person; and 10) washing your hands with soap or alcohol. The questionnaire had 17 questions. The rating scale for health communication, personal healthy habits, and COVID-19 preventive behaviors was divided into 4 items: "never," "sometimes," "often," and "always." Each item was scored as 4 (always), 3 (often), 2 (sometimes), and 1 (never). The latent variables consisted of 1) personal data 2) personal healthy habits and 3) health communicable and the dependent variable was the COVID-19 prevention behavior. The average score of personal healthy behaviors, health communication, and COVID-19 preventative behavior were separated into four groups: poor (1.00-1.75), fair (1.76-2.50), good (2.51-3.25), and very good (3.26-4.00). Five experts accepted the tests' content validity, and a tryout of 80 people who were notably similar to the sample group confirmed their dependability. The item's objective congruence value ranged between 0.80 and 1.00. Furthermore, the analysis was carried out utilizing the Cranach alpha approach. The reliability coefficient for the interview was between 0.80 and 0.84.

## **Data Analysis**

The data were analyzed using descriptive statistics and inferential statistics. Descriptive statistics were applied to explain the characteristics of latent and dependent variables in percentage, mean, and standard deviation. Pearson's correlation coefficient and structural equation modeling (SEM) were used to examine the relationships between the measured variables and determine the causal relationships between variables. The causal relationship model was evaluated using the AMOS program. SEM was used after all relevant assumptions were met. The fit of the hypothesized model was assessed using several criteria, including the chi-square test ( $\chi^2$ ,  $p > 0.05$ ), the normed chi-square ( $\chi^2/df.$ ) with a desired range of 2–5, the root mean square error of approximation (RMSEA) and root of mean square residual (RMR)  $\leq 0.05$ , the comparative fit index (CFI)  $\geq 0.90$ , the normed-fit index (NFI)  $\geq 0.90$ , the standardized root mean square residual (SRMR)  $\leq 0.05$ , and the goodness-of-fit index (GFI) and adjusted goodness of fit index (AGFI)  $\geq 0.90$ . Statistical significance was set at  $p < 0.05$  for all analyses. <sup>(17)</sup>

## **Results**

### ***Respondent Characteristics, Personal Healthy Habits, Health Communication, and Preventive Behavior***

Four hundred samples were obtained for this research. According to Table 1, among 400 participants, most were female (67.0%), and 63.5% had chronic diseases. Their mean score for healthy habits was 8.02 ( $\pm 1.60$ ), their mean score for health communication was 5.88 ( $\pm 1.36$ ), and their mean score for COVID-19 preventative behaviors was 32.58 ( $\pm 4.74$ ) (see Table 1).

In terms of personal healthy habits and health communication, the majority of participants slept at least 8 hours per day (56.8%), followed by 40.8% consuming nutritious food and 40.0% exercising 30 minutes per day. In health communication, most participants (51.2%) always ask about and observe problematic signs and symptoms in their family and neighbors, followed by 48.3% frequently discussing COVID-19 with their relatives and friends.

Regarding COVID-19 preventative behaviors, most samples were well-versed in receiving COVID-19 vaccine shots (49.0%) and 42.8% confirmed ATK if they had closed communication with the patient, respectively. In addition, many participants prevented COVID-19 behaviors at a moderate level by observing odd symptoms themselves during the COVID-19 pandemic (60.3%), followed by 57.5% washing their hands with soap or alcohol, 54.0% wearing masks when leaving the house, 54.0% keeping a distance of at least 1–2 meters from others, 49.8% avoiding crowded after close interaction with a patient, 47.8% wearing a mask while cutting hair, and 47.0% staying away from overcrowded places if they feel sick, respectively (see to Table 2–3).

**Table 1** Personal data, Healthy habits, Health communication, and COVID-19 preventive behaviors (n= 400)

Variables	Number (%)
<b>Gender</b>	
Male	132(33.0)
Female	268(67.0)
<b>Having chronic diseases,</b>	
No	146(36.5)
Yes	254(63.5)
<b>Personal healthy habits(scores), (min-max), (mean ± SD)</b> (4-12)( 8.02±1.60)	
Never (Mean 1.00-1.75)	9(2.3)
Sometimes (Mean 1.76-2.50)	155(38.8)
Often (Mean 2.51-3.25)	178(44.5)
Always (Mean 3.26-4.00)	58(14.5)
<b>Health communication (scores), (min-max), (mean ± SD)</b> (2-8)( 5.88±1.36)	
Never (Mean 1.00-1.75)	8(2.0)
Sometimes (Mean 1.76-2.50)	117(29.3)
Often (Mean 2.51-3.25)	179(44.8)
Always (Mean 3.26-4.00)	96(24.0)
<b>COVID-19 preventive behaviors(scores) (min-max), (mean ± SD)</b> (19-40)( 32.58±4.74)	
Never (Mean 1.00-1.75)	0(0.0)
Sometimes (Mean 1.76-2.50)	28(7.0)
Often (Mean 2.51-3.25)	191(47.8)
Always (Mean 3.26-4.00)	181(45.3)

**Table 2** Number, percentage, mean, and standard deviation of Personal healthy habits, and Health communication distributed by individual item (n = 400)

Latent Variables	Number (%)				Mean ±SD	Interpretation
	Never	Sometimes	Often	Always		
<b>Personal healthy habits</b>						
1. Consume food that is completely in nutrients	0(0)	185(46.3)	163(40.8)	52(13.0)	2.67±0.70	Good
2. Take at least 8 hours of sleep per day	5(1.3)	113(28.2)	227(56.8)	55(13.8)	2.83±0.67	Good
3. Take 30 minutes of exercise every day	35(8.8)	163(40.8)	160(40.0)	42(10.5)	2.52±0.80	Good
<b>Health communication</b>						
1. Inform your families and neighbors about COVID-19	7(1.8)	114(28.5)	193(48.3)	86(21.5)	2.90±0.75	Good
2. Check for odd signs and symptoms in families and neighborhoods	7(1.8)	91(22.8)	205(51.2)	97(24.3)	2.98±0.74	Good

**Table 3** Number, percentage, mean, and standard deviation of COVID-19 preventive behaviors, distributed by individual item (n = 400)

Dependent variable	Number (%)				Mean ±SD	Interpretation
	Never	Sometimes	Often	Always		
1. Take an injection of COVID-19 vaccination.	10(2.5)	28(7.0)	166(41.5)	196(49.0)	3.37±0.72	Very good
2. Avoid crowded places if I feel bad.	2(0.5)	31(7.8)	188(47.0)	179(44.8)	3.36±0.65	Very good
3. Avoid crowded places after close interacting with a patient.	1(0.3)	29(7.2)	199(49.8)	171(42.8)	3.50±0.62	Very good
4. Wear a mask when leaving the house.	0(0)	35(8.8)	216(54.0)	149(37.3)	3.29±0.62	Very good
5. Wear a mask while cutting hair.	8(2.0)	44(11.0)	191(47.8)	157(39.3)	3.24±0.73	Good
6. Check ATK if I had closed communication with a patient.	11(2.8)	56(14.0)	162(40.5)	171(42.8)	3.23±0.79	Good
7. Maintain a distance of at least 1-2 meters from others.	0(0)	50(12.5)	213(53.3)	137(34.3)	3.22±0.65	Good
8. Observed odd symptoms in myself during the COVID-19 pandemic	0(0)	35(8.8)	241(60.3)	124(31.0)	3.22±0.59	Good
9. Maintain a space when eating with another individual.	1(0.3)	53(13.3)	212(53.0)	134(33.5)	3.20±0.66	Good
10. Wash my hands with soap or alcohol.	1(0.3)	64(16.0)	230(57.5)	105(26.3)	3.10±0.65	Good

### **Correlation Analysis Between COVID-19 Preventive Behaviors and Independent Variables**

Gender significantly influenced COVID-19 prevention action among seniors ( $r = -0.80$ ,  $p < 0.05$ ). Additionally, having chronic diseases and personal healthy practices were associated with correlation coefficients of 0.08 and 0.33, with  $p < 0.05$  and  $p < 0.001$  for all pairs, respectively. The relationship value for health communication was 0.45 ( $p < 0.01$ ) (refer to Table 4).

**Table 4** Pearson's correlation coefficient between the main variables (n = 400)

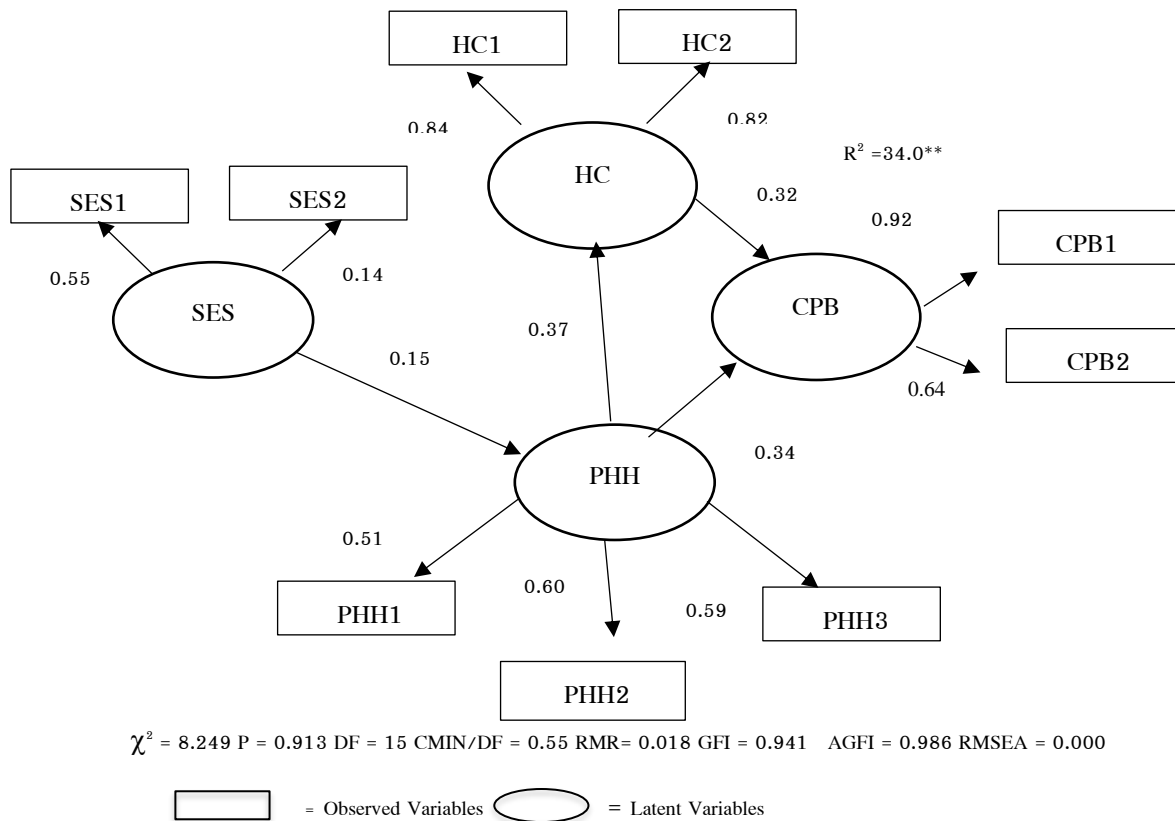
	r	p-value
1. Gender(female=1)	-0.80	0.045*
2. Having chronic diseases(yes=1)	0.08	0.044*
3. Personal healthy habits	0.33	0.000***
4. Health communication	0.45	0.000***

### **A causal relationship model for COVID-19 prevention**

Figure 1 illustrates the findings of the SEM measurement model. The fit indices for this were good ( $\chi^2 = 8.249$ ,  $P = 0.913$ ,  $DF = 15$   $CMIN/DF = 0.55$ ,  $RMR = 0.018$ ,  $GFI = 0.941$ ,  $AGFI = 0.986$ ,  $RMSEA = 0.000$ ) [90% confidence interval: .014-0.92]. Table 5 displays the causal model results for the SEM. The direct and indirect effect findings revealed the following: 1) HC has a direct (0.32) and indirect (0.12) effect on CPB through PHH, and it mediates the link between SES and CPB. 2) PHH has a substantial direct influence on CPB (0.34) and an indirect effect via

HC of 0.12, while SES has an indirect effect (0.05) on CPB through PHH. The fit indices were favorable. COVID-19 preventative practices affected SES (0.05), PHH (0.46), and HC (0.32). The model explained 34% of the variation ( $R^2$ ), which was statistically significant ( $p$ -value < 0.01) (refer to Figure 1 & Table 5).

**Figure 1:** A causal relationship model of COVID-19 prevention behaviors among older adults



SES = Personal data, SES1= Gender, SES2= being chronic diseases

PHH= Personal Healthy Habits, PHH1=Eat complete, PHH2=Sleep adequately,PHH3=Daily exercise

HC= Health Communication, HC1= Information to family & neighbors, HC2= Talk symptoms to family & neighbors

CPB=COVID-19 Preventive Behavior, CPB1=Prevention outside their house, CPB2=Protective behavior

**Table 5** Direct, indirect, and total effects.

COVID-19 Preventive Behaviors	COVID-19 Preventive Behaviors		
	Direct Effect	Indirect Effect	Total Effect
Health Communication-> COVID-19 Preventive Behaviors	0.32	0.00	0.32
Personal Healthy Habits-> COVID-19 Preventive Behaviors	0.34	0.12	0.46
Personal Healthy Habits->Health Communication-> COVID-19 Preventive Behaviors			
Personal data ->Personal Healthy Habits-> COVID-19 Preventive Behaviors	0.00	0.05	0.05

## Discussion

The findings of this study shed a spotlight on the behaviors and factors influencing COVID-19 prevention actions in the sampled population. The causal relationship model of older people's COVID-19 preventative behavior, based on hypotheses, had a good level of consistency with empirical data, as indicated by a chi-square value of 8.249, a degree of freedom of 15, a  $\chi^2/df$  ratio of 0.550, and a p-value of 0.913. The fit indices were robust (GFI = 0.941, AGFI = 0.986, SRMR, and RMSEA = 0.00). Personal healthy habit factors (0.34) and health communication factors (0.32) showed direct effects on the model, whereas healthy habit factors (0.12) and personal factors (0.05) had an indirect influence. These variables combined explained 34.0% of the variance in preventive behavior. Personal healthy habits, health communication, and personal characteristics were found to be the most important determinants of COVID-19 preventive activities.

**Gender and COVID-19 Preventative Actions;** The data found that gender significantly influences COVID-19 preventative efforts among seniors. This negative link indicates that male seniors may participate in fewer preventive measures than their female counterparts. According to a study published by Zhong et al.<sup>(18)</sup> during the early stages of the COVID-19 pandemic found that women were more knowledgeable about and reported actively seeking health-related knowledge, paid greater attention to the prospect of global epidemics, and were much more aware of how the products they ordered in their daily lives affected their health than men. Women were also shown to obtain much more informal health-related information from close family members, relatives, friends, and coworkers than men. Furthermore, Abdelrahman<sup>(19)</sup> and Moran & Del<sup>(20)</sup> found that women engaged in greater interpersonal distancing behaviors and were more likely to avoid crowds and physical contact with others to avoid respiratory pandemic infections than men. These findings revealed the significance of individual differences in responding to the COVID-19 pandemic, as well as crucial information about the drivers of social distancing strategies. This finding correlates with previous research illustrating that women are more health-conscious and adhere to health guidelines than men. Public health initiatives should consequently address gender-specific methods to increase male elders' involvement with COVID-19 preventive practices.

**Chronic Conditions and Personal Healthy Practices;** Chronic diseases have been associated with improved personal health practices. Individuals with chronic conditions may be more concerned about their health and, hence, more inclined to adopt healthy lifestyle practices to manage their conditions. This increased awareness and proactive activity are essential for treating chronic illnesses and avoiding complications, particularly during pandemics. This data could inform health communication initiatives, such as targeting chronic disease patients with targeted messages emphasizing the significance of continuing vigilance and healthy practices. Previous research has

confirmed the link between chronic illnesses and better personal health behaviors, as found in this study. For example, Anderson et al.<sup>(21)</sup> discovered that people with chronic diseases often increase their physical activity (PA) to manage their conditions better. This includes regular physical activity (PA) in daily activities, balanced nutrition, and adherence to medical advice, which are crucial during a pandemic. Similarly, Zewdie et al. determined that 44% of the sample size was more likely to follow COVID-19 guidelines to avoid challenges, which is in keeping with our findings of a positive correlation between chronic diseases and health practices.<sup>(22)</sup>

**Personal Healthy Habits and COVID-19 Preventative Behaviors:** Personal healthy habits (PHH) were shown to have a significant direct influence on COVID-19 preventative behaviors (CPB) and an indirect effect through health communication (HC). This underscores the importance of maintaining healthy lifestyles, as these habits directly contribute to better adherence to preventive measures. Encouraging the population to adopt and sustain healthy habits such as adequate sleep, nutritious diets, and regular exercise can enhance their overall resilience against COVID-19 and other health threats. Yoo and Song<sup>(23)</sup> found that personal cleanliness habits had an indirect positive influence on infection prevention behaviors via self-efficacy. This is consistent with the discovery that personal healthy habits have a strong direct impact on COVID-19 prevention activities. Similarly, Hu et al.<sup>(24)</sup> and Sousa et al.<sup>(25)</sup> discovered that those who had good personal health behaviors, such as regular exercise and a nutritious diet, were more likely to follow COVID-19 preventative measures. This is consistent with our findings that personal healthy habits have a strong direct impact on COVID-19 prevention activities and preventative behaviors. The study by Al-Dmour et al.<sup>(26)</sup> also supports the idea that promoting healthy lifestyles can lead to better adherence to health guidelines, further validating our results.

**Health Communication as a Mediator;** Health communication (HC) served as an important link between personal healthy habits (PHH) and COVID-19 preventative efforts. It might be due to effective health communication approaches are essential for increasing health awareness and encouraging preventive behavior. The findings highlight the significance of consistent, clear, and focused communication efforts in ensuring that people are aware of and motivated to engage in health-promoting behaviors. Health communication has long been regarded as a critical component of dealing with public health emergencies. Reddy et al. revealed that effective communication tactics greatly improve healthcare compliance during pandemics.<sup>(27)</sup> Our study's presentation that health communication mediates the association between personal healthy habits and COVID-19 preventative behaviors emphasizes its significance. Furthermore, Dubé et al.<sup>(28)</sup> stressed the importance of clear, consistent, and culturally responsive health communication strategies for success. This reinforces our advice for improved health communication efforts.

**Conclusion and recommendation:** This study found a direct association between health communication (HC) and COVID-19 preventative behaviors (CPB), with personal healthy habits (PHH) acting as a moderator. This is comparable with previous SEMs conducted on older persons utilizing COVID-19 preventative behavior models. Gender and chronic illness (SES) also influenced health communication performance. The current findings could be used in policymaking to build appropriate programs to encourage positive COVID-19 preventative behaviors and avoid additional COVID-19 infections and other emerging illnesses, particularly among the elderly. These findings have several practical consequences and recommendations, including: 1) Gender-Specific Interventions: Create and implement gender-specific public health interventions to encourage preventative behaviors in male seniors. 2) Chronic Disease Management: Encourage patients with chronic illnesses to adopt preventive eating habits by emphasizing the need to maintain healthy behaviors while employing preventative measures. Promoting healthy habits is a critical component of sickness prevention initiatives. 4) Improved Health Communication: Develop health communication strategies that are clear, consistent, and tailored to the needs of various demographic groups. In the future, research and development should implement the variables from this study for COVID-19 Prevention Behavior of Older Adults or other upper respiratory tract infections.

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